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THE LATE PROFESSOR WESTWOOD.

We are much pleased to be able to give in this issue a likeness of the very eminent entomologist, Professor Westwood, for which we are indebted to the kindness of the publishers of the *Illustrated London News*.

John Obadiah Westwood, M.A., F.L.S., etc., was born at Sheffield, England, on the 22nd of December, 1805, and died shortly after completing his 87th year, on the 2nd of January last. His father was a die-sinker at Sheffield, but afterwards removed to Lichfield. When nearly 16 years of age, he went to London to be articled to a solicitor, and though he devoted his attention more to the study of natural history than of law, he was admitted as a solicitor and became partner in a firm. Having some private means, which he augmented by writing and drawing, he was enabled to neglect his profession and give himself up almost entirely to entomology and archæology.

To quote Mr. McLachlan's obituary notice in *The Entomologists' Monthly Magazine*, "it was probably by his rare, artistic talent that he acquired much of his justly great reputation. His drawings of insects were masterpieces of accuracy without the slightest attempt at effect, and rapidly executed; few have equalled him in correct delineation. There certainly never has been an entomologist who left behind him so much evidence, in practical work, of his ability to delineate insects, even to the most minute dissections. But Westwood was much more than an artist in entomology. There probably never has existed, and, in the present state of the science, there never can again exist, one who had so much general knowledge, both from personal investigation and a study of the works of others; one who was less of a specialist in the modern acceptation of the term. It is true he was a specialist, but it was in the way of taking up small groups in all orders, and working them out thoroughly, his artistic talent giving merit and force to those small monographs. Under a somewhat brusque manner was concealed a hearty sympathy for all real workers, and, if he offended, it was commonly in the way of pointing out to would-be introducers, etc., of supposed novelties that some one or other had already made similar observations, his vast mem-

ory rendering him very dangerous in this respect. In society there could be no more genial companion, full of anecdote, but with small appreciation of humour. At home there could be no more generous host."

Professor Westwood was best known on this side of the Atlantic from his admirable work—"An Introduction to the Modern Classification of Insects," which was published in two volumes in 1839 and 1840. Every entomologist, worthy of the name, has no doubt made a study of this book, which still continues to be the best text-book on the subject in the English language. His sumptuous works on exotic insects, such as his "Arcana Entomologica," "Oriental Entomology," and his edition of Drury's "Exotic Insects," are also widely known, but his numerous contributions to various Natural History periodicals, a mere list of which would fill a volume, are not so familiar to our students. He was a most industrious and prolific writer, and made investigations in almost every family of insects in all the orders. His work is always characterized by its marvellous accuracy and patient elaboration of details both of structure and habit. Very rarely was he ever known to make a mistake.

He was actively associated with the Entomological Society of London from its foundation in 1833, and was for many years its Secretary. Subsequently he was elected President at three periods of two years each, and was made Honorary Life President when the Society celebrated its jubilee in 1883. He was a Fellow of the Linnæan Society from 1827, and an Honorary or Corresponding Member of Scientific Societies all over the world.

In 1858 the Rev. F. W. Hope, a wealthy amateur, who had been for years a warm friend and patron of Westwood, and had purchased his collections, gave them and his own to the University of Oxford, and founded a Professorship of Invertebrate Zoology, which bears his name. Westwood was appointed the first Hope Professor, and, in consequence, removed to Oxford, where he was a conspicuous figure in the University for five and thirty years.

Besides his Entomological work, he was a distinguished Archæologist and was widely known amongst those of kindred tastes by his investigations of the "Palæographia Sacra Pictoria," his "Lapidarium Walliæ," and "Fac Similes of the Miniatures and Ornaments of Anglo-Saxon and Irish Manuscripts." He formed a remarkable collection of carved ivories and inscribed stones, as well as of insects. In all respects he was a remarkable man, and accomplished, by dint of steady industry and enthusiastic perseverance during a long life, an amount of valuable scientific work that has rarely, if ever, been excelled.

THE FIFTH ANNUAL MEETING OF THE ASSOCIATION OF
ECONOMIC ENTOMOLOGISTS.

ABSTRACTED FROM THE OFFICIAL MINUTES BY L. O. HOWARD, FOR THE
CANADIAN ENTOMOLOGIST.

The fifth annual meeting of the Association of Economic Entomologists was held at Madison, Wisconsin, in the Science Hall of the University of Wisconsin, on August 14, 15 and 16, 1893.

Sixteen members were present, as follows:—President S. A. Forbes, Second Vice-President J. B. Smith, Secretary H. Garman, J. M. Aldrich, G. F. Atkinson, G. C. Davis, C. P. Gillette, A. D. Hopkins, L. O. Howard, M. E. Murtfeldt, H. Osborn, C. V. Riley, P. H. Rolfs, H. E. Summers, F. M. Webster and H. E. Weed. A number of visitors and members of other scientific associations were present during the sessions, making rather a large attendance.

The following papers were presented, among them several from foreign entomologists, and the discussions were of the greatest interest. I shall briefly mention the papers in the order of their presentation:—

The annual address of President S. A. Forbes reviewed the 115 economic articles containing new matter published by members of the Association since the last meeting. These articles he grouped by subjects and by nature of outcome, thus giving an admirable idea of the work of the year in shape for the drawing of conclusions. He called attention to a narrowness of view and consequent inadequacy in the treatment of general questions, due to the want of comprehensive organization and systematic co-operation. In his opinion the methods of publication and enforcement of results now in general use fall far short of their final end. As a result the farmer has not responded to the suggestions of the investigating entomologist as might be anticipated. He suggested that more attention might be paid to describing the effects of the insect work than to the insects themselves, subordinating the account of the insects. He insisted that instead of making an entomologist of the farmer we should make a farmer of the entomologist. He suggested distinguishing between the temporary and permanent presentation of facts in economic publications, advising the preparation of special economic summaries or monographs of all insect injuries to each of the various crops, and printing and distributing these summaries in great numbers. Co-operation in this particular line was urged. Addresses to Farmers' Institutes should be accompanied by a printed résumé to be distributed among those present.

He spoke of the fact that the boundaries of the States represented by official entomologists are artificial, and that in consequence matters of distribution and other broad questions are seldom touched. This fact and the danger of unnecessary duplication of work, and other reasons, called for organization, and this organization should be of flexible form, leaving each individual free to meet the special requirements of his individual work, and at the same time helping to concentrate the surplus effort which should be contributed to the accomplishment of common ends. He suggested that a committee on co-operation propose a list of subjects in which co-operative effort is desirable. These subjects should then be attacked by volunteers, who should report to the committee. In this way he thought that the benefits of organization might be obtained without the surrender of individual initiative.

The address was discussed by Messrs. Osborn, Smith and Webster. Messrs. Osborn, Smith and Garman were appointed a committee of three to consider the recommendations contained in the address.

Messrs. Edward H. Thompson, of Tasmania, R. Allan Wight, of New Zealand, and G. C. Davis, of Agricultural College, Michigan, were elected to membership.

Mr. Osborn presented a paper entitled "Methods of Treating Insects affecting Grasses and Forage Plants." In this paper he considered the insects affecting these crops by groups arranged according to the method of treatment, discussing particularly climatic conditions, natural enemies, agricultural methods and the direct method. He presented a most interesting table of insects, showing in horizontal columns the food-plants, number of annual broods, and the condition in which the species is to be found during any month in the year. The paper was discussed by Mr. Hopkins.

The next paper, by Mr. Howard, was entitled "Notes on Methods of studying Life-histories of Injurious Insects," in which he described the vivarium methods in use in the Division of Entomology of the U. S. Department of Agriculture, but insisted that outdoor work is preferable where feasible. The question of methods of ventilation of the insectary and kindred topics were discussed by Messrs. Forbes, Garman and Howard. Mr. Forbes thought that indoor work on life-histories should always be verified by outdoor observation.

Under the caption "Another Mosquito Experiment," Mr. Howard detailed his experience with the use of kerosene on the surface of mosquito

breeding pools since his announcement of his first experiment a year ago. Mr. Smith in discussion mentioned two cases where this remedy had been applied effectually on Long Island. Mr. Webster thought that further experimentation was needed on the line as to the office of mosquito larvæ in destroying organic matter in water, which might otherwise become offensive.

The Secretary read a paper by Dr. Ritsema Bos, on "*Phytomyza affinis*, Fall., as a Cause of Decay in Clematis." The larvæ of this little fly he had found to produce a disease spot on the stem a little above the level of the ground, causing the subsequent drying up of the stem. He found two generations of the fly each year, and advised the cutting off and burning of decaying stalks in early summer. Messrs. Hopkins and Garman reported similar appearances in potato stalks and the terminal twigs of apple, which were probably due to a closely allied insect.

Mr. Smith read a paper on "Farm Practice and Fertilizers as Insecticides." The nature of the paper is well indicated by its title. A number of instances were pointed out where variation in farm practice produces excellent insecticide results, and others in which commercial or artificial fertilizers destroy subterranean insects as well as invigorate the crop. The intelligent use of fertilizers combined with other intelligent farm practice, in his opinion will in the future prove the main reliance of the farmer. He showed, however, that the phosphates form a group of fertilizers which have no insecticide value.

Messrs. Garman and Webster discussed this paper, and agreed that the main beneficial results in the use of artificial fertilizers are due to the increased vigour of the plant, enabling it to better resist the attacks of insects. They doubted the primary insecticide effect of these compounds.

The above papers were all read at the first session of the Association, on the afternoon of August 14. At the second session, on the morning of the 15th, letters were read from certain foreign entomologists regretting their inability to attend the meeting.

Mr. Garman presented a paper on the "Preservation of Larvæ for Study." He drops the larva into water heated to the boiling point, leaving it for 15 seconds. Then, when the body wall is somewhat rigid, he takes it up with the forceps, and with a fine sharp scissors cuts a slit along the underside of the body, dropping it into the water again for a few seconds longer. It is then transferred to 50% alcohol, and in 12 hours to 70%, and in 12 hours afterwards to 95%, for permanent preservation.

Shape, colours and structure are well preserved in this way. As a substitute for alcohol he recommends:—boiling water, 250 cc.; common salt, 3 teaspoonfuls; powdered alum, one teaspoonful; pure carbolic acid, 5 drops; filter.

Mr. Forbes spoke of the preservation of fruits at the World's Fair, and suggested that plants injured by insects may be preserved in the same way. Mr. Summers had found nothing which would satisfactorily preserve fruits. Mr. Osborn thought that aqueous preparations would freeze. Mr. Smith has employed with success methods similar to those of Mr. Garman.

A paper by Mr. Cockerell, entitled "The Distribution of Coccidæ," was read by the Secretary. He compared the Coccidæ of the West India Islands with the adjoining mainland, and spoke of the further distribution of a number of species which he had studied in Jamaica. Of 18 species found on that Island all but 3 are known elsewhere, and 11 have been detected outside of neotropical regions.

Mr. Hopkins presented his views on "Note and Record-keeping for the Economic Entomologist." He described the system which he has worked out and adopted, and which he has proved to be well adapted to the requirements of his work. The system consists of an accession catalogue and a species catalogue. Specimens of his cards or note pads were exhibited, and Messrs. Smith, Osborn and Webster discussed the paper, Mr. Webster giving in full his own system of note-keeping. Messrs. Smith and Osborn objected to the use of check-list numbers alone for species as adopted by Mr. Hopkins.

Mr. Garman's paper on "Illustrations for the Economic Entomologist" was next presented. He considers that the object of illustrations is to convey information and to save time in description, finish and technique, being, therefore, matters of secondary importance. The different methods of reproducing drawings was very carefully and fully discussed. Etching was considered in general impracticable, as calling for a special method of drawing. Lithography was considered too expensive, and wood engraving is subject to liability of the engraver to misinterpret certain details of the drawing; but at the same time it was admitted that of our published figures wood-cuts are the best. In spite of its disadvantages, it is the most satisfactory method, although somewhat expensive. Cheap process figures are excellent for newspaper and other transient literature. Their right in permanent literature, and especially in scientific

writings, is questionable at the present time. No cheap process known to the writer gives good results in shaded figures. These figures give promise of something better in the near future. If it were not, however, for this hopeful outlook, it would be well to return to wood-engraving. Entomologists were urged to make their drawings with extreme care and to adapt them to a particular process, and not to rest satisfied with inferior reproduction. The paper was discussed by Messrs. Osborn, Weed, Smith, Hopkins, Gillette, Forbes and Howard.

Mr. Gillette read a paper on "The Arsenites and Arsenical Mixtures as Insecticides." The article comprised a general summary, historical and critical, of the use of these substances in their different combinations. The paper was discussed briefly by Messrs. Beal, Wood and Galloway, all of whom were present at the meeting, although not members of the Association.

Upon invitation, Mr. B. T. Galloway, Chief of the Division of Vegetable Pathology of the U. S. Department of Agriculture, gave a short account of some recent work done in his division upon a bacterial disease of melons and other cucurbits, which had been found to be largely disseminated by the agency of insects, particularly of *Diabrotica vittata* and *D. 12-punctata*. Messrs. Webster, Smith and Garman had seen the same disease in their respective localities.

At the third session, held in the afternoon of August 15, an amendment to the constitution was adopted levying annual dues of fifty cents upon each member of the Association, and a resolution was passed authorizing the publication of the whole proceedings in *Insect Life*, and the sending of an abstract to the CANADIAN ENTOMOLOGIST.

Messrs. Osborn, Webster and Weed were appointed a committee on nomination of officers.

Mr. Hopkins read a paper on "Destructive Scolytidæ and Their Imported Enemy." He gave a summary of the damage done by bark-boring beetles in West Virginia and other portions of the country, and his investigation of this damage in the former State. He further described his trip to Germany during 1892, and the collection of about 1,000 specimens of *Clerus formicarius*, which he brought alive to this country. He described the placing of the insects and their over-wintering. Up to the time of presentation of the paper no means of ascertaining to what extent the insects have multiplied had been found.

Mr. Riley presented a communication entitled "Parasitic and Predaceous Insects in Applied Entomology." He indicated the utility and importance of the subject, and pointed out the dangers and disadvantages resulting from false and exaggerated opinions. He gave an extended summary of the methods in which insect enemies of insects may be utilized; and followed with a chronological and detailed account of the suggestions and attempts, successful and otherwise, to introduce parasites and predaceous insects into one portion of a country from another, or into one country from another. He showed that the general laws governing the interactions of organisms, however, are such that we can in only very exceptional cases derive benefit by interference with them. The indigenous enemies of an indigenous insect are better qualified to keep it in check than an imported species. Where the injurious insect is a foreigner, however, and has been brought over without the enemy which keeps it in check in its native home, then the introduction of these enemies will be advisable. Thus the introduction of the European parasites of the Gypsy Moth would be advisable. Such an introduction could do no possible harm, and may be productive of lasting good.

Mr. Smith followed with a paper in the same line, called "The Economic Value of Parasites and Predaceous Insects." The writer, while realizing the importance of parasites in maintaining the balance of nature, felt that their economic value has been grossly over-estimated. He showed that parasites simply reduce excess, but only after damage to crops has been done. The practical utilization of parasites is more or less a myth, except in very exceptional cases like that of *Vedalia* and *Icerya*. An injurious insect which under natural conditions is abundant each year, must be dealt with without regard to parasites or natural enemies.

Mr. Webster read a paper on "Insect Foes of American Cereal Grains, with Measures for Their Prevention or Destruction." In the main the author insisted upon the importance of proper farm practice. He knows of no better insecticide than good farming. Four-fifths of the injury done by the Hessian Fly may be prevented by a better system of agriculture. The same point was elaborated with regard to other grain insects, and the serious ravages of a number of the most important pests were pointed out, and general consideration of the proposed direct remedies was entered into. In the opinion of Mr. Webster, the field of the economic entomologist is poorly defined at present,

and too much is expected from him. The science of applied agriculture should relieve him of some of his duties. This paper was discussed in some of its details by Messrs. Riley, Forbes and Howard.

The fourth session was held on the morning of August 16. The Committee on the President's Address reported in favor of the adoption of his recommendations and the appointment of a standing committee to present a detailed plan for co-operative work among members, and to make recommendations concerning legislation. The report was adopted, and Messrs. Osborn, Smith and Garman were appointed as a committee.

Mr. Forbes read a paper by H. Du Buysson upon "Fumigation with Carbon Bisulphide for the complete and rapid destruction of Insects which attack Herbaria, Furrieries and Woollen Stuffs." In this article a very ingenious and interesting water joint for the box used for fumigating purposes was described, and the best method of employing the box for the different classes of objects mentioned in the title was given. Mr. Atkinson stated in discussion that he had used a very similar box in fumigating objects infested by insects. Mr. Garman stated that at Cambridge a zinc-lined case was constantly used for disinfecting bird and mammal skins. Mr. Riley had used the bisulphide in the insect collections of the National Museum. Mr. Smith had used it against ants and Mr. Garman against the melon louse. The latter gentleman rolls the melon vines up into a heap, inverts a tub over them, and places a little bisulphide in a saucer under the edge of the tub.

Mr. Atkinson read a paper by Dr. J. Ritsema Bos, on "*Aphelenchus olesistus*, nov. sp., a nematoid worm, causing Leaf-sickness in Begonia and Asplenium." He referred to a note by Mr. Atkinson, read at the preceding meeting of the Association, in which an Anguillulid is described as affecting leaves of Chrysanthemum and Coleus, making no swelling or deformity, but causing brown patches on the leaves. The author having studied and described *Aphelenchus olesistus* in Europe, where it causes almost precisely the same trouble with Begonia and Asplenium, he is inclined to think that the species previously mentioned by Mr. Atkinson is identical. In the discussion, Mr. Atkinson stated that while there were characters in the form studied by him which seemed to place it in the genus *Tylenchus*, he thought that careful comparison of types might show the two to be identical.

Mr. Osborn presented a paper on "Methods of Attacking Parasites of Domestic Animals." The preventive measures consisted in the ex-

amination of the introduced animals and the application of the usual direct methods. A critical summary of all the proposed remedies followed. The paper was briefly discussed by Messrs. Gillette, Aldrich, Riley, Hopkins, Weed and Howard. Mr. Riley, in speaking of the alleged poor success on the part of certain individuals in the use of kerosene emulsion, said that the difficulties of making a good emulsion and of getting intelligent farmers to use it safely are unnecessarily magnified. He further stated that he could not accept the opinion that in the case of two given remedies the poorer one was to be recommended, because the better one required a little more care and intelligence in making and using.

In the paper by Mr. Weed on "Remedies for Insects Injurious to Cotton," the author discussed the application of Paris green against the Cotton Worm by means of bags at the extremities of a long pole, carried by a "darkey" on a mule, going at a brisk trot between the rows. This he considered to be the most simple apparatus which he had seen for distributing dry poisons. For the Boll Worm, he considered the best application to be the planting of a row of corn about every tenth row through the cotton field at such a time that it will mature early in September.

In Miss Murtfeldt's paper on "The Cheese or Meat Skipper," which followed, the author drew an interesting parallel between the tendency of the farmer to exaggerate his losses from insect damage and that of the commercial man to underestimate this damage and to conceal it because of its possible influence upon his trade. She reviewed the literature of *Piophilæ casei*, and said that accounts of its life-history are not readily accessible in this country. She gave a popular synopsis of her personal observations upon the species, particularly as injuring hams. The larvæ feed principally around the bony ends among the tendons, and in the fat and in the oil-saturated folds of the canvas wrappers. Hibernation is in the adult stage. About thirty eggs are laid by each female. The larval stage lasts from seven to eight days, and the puparium state about ten days. There is no definite succession of broods, and the insect may be found in all stages from May until November. The flies are readily killed by the fumes of burning sulphur or pyrethrum powder. The covering of windows with a light domestic is advised, as the flies will get through ordinary wire screens. The paper was briefly discussed by Messrs. Aldrich and Riley.

Mr. Coquillett's paper, entitled "Hydrocyanic Acid Gas as an Insecticide," was read by the Secretary. The paper consisted of an historical review of the use of this gas in California, together with an account of the methods in use at the present time, and some slight consideration of its effect upon different insects. The cost of fumigating a tree varies from five cents to one dollar, and even at the latter rate figures were produced to show that it is economical.

A paper by Dr. J. A. Lintner, on "Arsenical Spraying of Fruit Trees while in Blossom," was read by Mr. Smith. The author reviewed the experiments by Mr. Webster, and the statements by Mr. Cook, and suggested that the whole question can be settled by confining a hive of healthy bees to blossoms sprayed with Paris green, and afterward testing the stomach for arsenic. The law against spraying while trees are in blossom, as passed by the Legislature of Ontario, was reviewed, and a long list of the insects which might be satisfactorily treated by arsenical spraying at the time of blossoming was given. Further experimentation was strenuously urged. Some discussion followed by Messrs. Webster and Garman.

The fifth session was held in the afternoon of the 16th August. The following officers for the ensuing year were elected:—

President, L. O. Howard.

First Vice-President, J. B. Smith.

Second Vice-President, F. L. Harvey.

Secretary, C. P. Gillette.

Three papers on the insects of the season in their respective localities were read by Messrs. Webster, Smith and Osborn, and were discussed by Mr. Riley.

A paper by Mr. R. Allan Wight, of Auckland, New Zealand, was read by Mr. Osborn; it was entitled "*Icerya purchasi* and *Vedalia cardinalis* in New Zealand." The paper consisted of a condensed summary of the history of these two insects in New Zealand and their inter-relations. This paper was discussed by Mr. Riley.

Mr. Smith then read a paper by Mr. F. W. Urich, of Port of Spain, Trinidad, consisting of "Notes on Some Insect Pests of Trinidad, B. W. I." The paper was an interesting summary of Mr. Urich's observations on the injurious insects of that Island, and referred mainly to Coccidæ and their natural enemies, a leaf-cutting ant (*Atta sexdens*), a longicorn beetle (*Steirastoma depressum*) and certain Acridiidae. Especial mention of a little Cyprinodont fish was made. This fish is found commonly all through Trinidad, and feeds upon mosquito larvæ. Mr. Urich suggested its introduction into America for use in tanks and ponds.

The Secretary then read a "Note on Slip-records," by Mr. Cockerell. The author suggested the use of a uniform system of notes upon slips of a uniform size by all entomologists, and submitted samples. The question was discussed by Messrs. Hopkins, Summers and Riley.

The Association then adjourned subject to the call of the Executive Committee.

LIST OF COLEOPTERA TAKEN AT SPARROW LAKE, ONT.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Sparrow Lake is an expansion of the Severn river, situate a little south of lat. 45° and east of 80° longitude. Geologically, this part of Ontario belongs to the Laurentian formation, and that of a very rugged type. The southwest side of the lake, where these coleoptera were taken, save in a few spots among the rocks, is wholly uncultivated and uncultivable to the Georgian Bay, a distance of from 20 to 30 miles. Till recently it sustained an immense forest growth, mostly pine, which has now disappeared, and has been succeeded by a dense and almost impenetrable jungle of briars and bushes of many deciduous species.

So far as coleoptera are concerned, a large majority of the species inhabiting this district must be considered autochthonous, and it is not difficult to determine approximatively such as are following the little spots of cultivation that are being interjected. The collecting was done from July 20th to August 15th. That the list is no longer is not altogether the fault of the collector; in fact, in addition to the paucity of species, while some are in great abundance, the majority are each represented by from one to three examples only.

As this part of Ontario is in a comparatively primitive condition, and no record of the coleoptera inhabiting it has been observed, the subjoined list may be of some interest:—

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|------------------------------------|------------------------------------|
| Cicindela repanda, <i>Dej.</i> | Pterostichus corvinus, <i>Dej.</i> |
| var. 12-guttata, <i>Dej.</i> | erythropus, <i>Dej.</i> |
| Cychrus Lecontei, <i>Dej.</i> | Amara exarata, <i>Dej.</i> |
| Carabus sylvosus, <i>Say.</i> | pallipes, <i>Kirby.</i> |
| Calosoma scrutator, <i>Fab.</i> | rubrica, <i>Hald.</i> |
| Wilcoxi, <i>Lec.</i> | Calathus gregarius, <i>Say.</i> |
| calidum, <i>Fab.</i> | Platynus sinuatus, <i>Dej.</i> |
| Elaphrus ruscarius, <i>Say.</i> | extensicollis, <i>Say.</i> |
| Loricera cærulescens, <i>Linn.</i> | atratus, <i>Lec.</i> |
| Nebria pallipes, <i>Say.</i> | melanarius, <i>Dej.</i> |
| Scarites subterraneus, <i>Fab.</i> | corvus, <i>Lec.</i> |
| Dyschirius nigripes, <i>Lec.</i> | placidus, <i>Say.</i> |
| Bembidium patrule, <i>Dej.</i> | Bogemanni, <i>Gyll.</i> |
| versicolor, <i>Lec.</i> | ruficornis, <i>Lec.</i> |
| Sp. undetermined. | Galerita janus, <i>Fab.</i> |

- Tachys nanus*, *Gyll.*
 flavicauda, *Say.*
Patrobus longicornis, *Say.*
Pterostichus honestus, *Say.*
 coracinus, *Newm.*
 stygicus, *Say.*
 lucublandus, *Say.*
 caudicalis, *Say.*
 luctuosus, *Dej.*
Agonoderus pallipes, *Fab.*
Harpalus erraticus, *Say.*
 viridiæneus, *Beauv.*
 Sp. undetermined.
 pennsylvanicus, *De G.*
 fallax, *Lec.*
 pleuriticus, *Kirby.*
 viduus, *Lec.*
Stenolophus plebeius, *Dej.*
 conjunctus, *Say.*
Anisodactylus Harrisii, *Lec.*
 interstitialis, *Say.*
Ilybius biguttatus, *Germ.*
Hydaticus stagnalis, *Fab.*
Dytiscus fasciventris, *Say.*
Gyrinus canadensis, *Reg. ?*
 analus, *Say.*
Berosus striatus, *Say.*
Philydrus perplexus, *Lec.*
Hydrobius fuscipes, *Linn.*
Creniphilus sub-cupreus, *Say.*
Cercyon pygmæum, *Ill.*
Necrophorus vespilloides, *Hbst.*
Silpha Americana, *Linn.*
Pæderus littorarius, *Grav.*
Sunius longiusculus, *Mann.*
Tachinus repandus, *Horn.*
 fimbriatus, *Grav.*
Erchomus ventriculus, *Say.*
- Lebia viridis*, *Say.*
Metabletus americanus, *Dej.*
Cymindis pilosa, *Say.*
Brachynus cyanipennis, *Say.*
Chlænien sericeus, *Forst.*
 pennsylvanicus, *Say.*
Anomoglossus emarginatus, *Say.*
Brachylobus lithophilus, *Say.*
Liodes discolor, *Mels.*
Homalota trimaculata, *Er.*
Bolitochara picta, *Fauv.*
Aleochara bimaculata, *Grav.*
 graciliformis, *Fauv.*
Gyrophæna vinula, *Er.*
Quedius fulgidus, *Fab.*
 lævigatus, *Gyll.*
Listrotrophus cingulatus, *Grav.*
Creophilus maxillosus, *Linn.*
Staphylinus violaceus, *Grav.*
Philonthus politus, *Linn.*
 longicornis, *Steph.*
 micans, *Grav.*
 cyanipennis, *Fab.*
 sordidus, *Grav.*
 Sp. undetermined.
Xantholinus obsidianus, *Mels.*
 emmesus, *Grav.*
 obscurus, *Er.*
 N. S. (found here).
Baptolinus longiceps, *Fauv.*
Stenus—3 sp.
Lathrobium punctulatum, *Lec.*
 bicolor, *Lec.*
Stilicus, sp.
Histerdepurator, *Say.*
 sedecimstriatus, *Say.*
 carolinus, *Payk.*
 Lecontei, *Mars.*

Conosoma pubescens, Payk.
Boletobius cincticollis, Say.
Olisthærus substriatus, Gyll.
Oxyporus femoralis, Grav.
 rufipennis, Lec.
Oxytelus sculptus, Grav.
 pennsylvanicus, Er.
 insignitus, Grav.
Trogophlæus 4-punctatus, Say.
Scaphisoma convexum, Say.
Hippodamia 13-punctata, Linn.
Coccinella trifasciata, Linn.
Chilocorus bivulnerus, Muls.
Psyllobora 20-maculata, Say.
Hyperaspis signata, Oliv.
Scymnus lacustris, Lec.
Endomychus biguttatus, Say.
Tritoma thoracica, Say.
Silvanus bidentatus, Fab.
Læmophlæus fasciatus, Mels.
Calopteron terminale, Say.
Calochromus perfaceta, Say.
Ellychnia corusca, Linn.
Telephorus lineola, Fab.
 scitulus, Say.
Collops tricolor, Say.
Trichodes Nuttalli, Kirby.
Hydnocera pallipennis, Say.
 longicollis, Zieg.
Cis fuscipes, Mellie.
Canthon lævis, Drury.
Onthophagus Hecate, Panz.
Dialytes striatulus, Say.
 Ulkei, Horn.
Aphodius fossor, Linn.
 fimetarius, Linn.
 uricola, Mels.
 leopardus, Horn.

Epurea Erichsonii, Reit.
 Sp.
Ips fasciatus, Oliv.
Stephostethus liratus, Lec.
Corticaria pusilla, Mann.
 pumila, Lec.
Tenebrioides corticalis, Mels.
Cyphon obscurus, Guer.
Deltometopus amnicornis, Say.
Dromaeolus Harringtoni, Horn.
Alaus myops, Fab.
Agriotes fuscus, Lec.
 Sp.
Melanotus castanipes, Payk.
 fissilis, Say.
Corymbites medianus, Germ.
 propola, Lec.
Dicerca tuberculata, Chev.
 Sp. undetermined.
Buprestis rusticorum, Kirby.
 fasciata, Fab.
Agrilus ruficollis, Fab.
Valgus canaliculatus, Fab.
Hylotrupes bajulus, Linn.
 ligneus, Fab.
Calloides nobilis, Say.
Arhopalus fulminans, Fab.
Xylotrechus sagittatus, Germ.
Clyanthus ruricola, Oliv.
Euderces picipes, Fab.
Desmocerus palliatus, Forst.
Centrodera decolorata, Harr.
Gaurotes cyanipennis, Say.
Typocerus sparsus, Lec.
 velutinus, Oliv.
Leptura nitens, Forst.
 canadensis, Oliv.
 vagans (var. *brevis*, Kirby)

Aphodius lentus, *Horn.*
Geotrupes splendidus, *Fab.*
Anomala lucicola, *Fab.*
Ligyris relictus, *Say.*
Euphoria fulgida, *Fab.*
Osmoderma scabra, *Beauv.*
Trichius affinis, *Gory.*
Pachybrachys femoratus, *Oliv.*
 hepaticus, *Mels.*
Monachus saponatus, *Fab.*
Diachus auratus, *Fab.*
Adoxus obscurus (var. *vitis*, *Fab.*)
Xanthonia 10-notata, *Say.*
Typophorus canellus (var. *aterri-*
 mus.)
Chrysochus auratus, *Fab.*
Rhabdopterus picipes, *Oliv.*
Doryphora 10 lineata, *Say.*
Chrysomela bigsbyana, *Kirby.*
Galerucella nymphææ, *Linn.*
Diabrotica 12-punctata, *Fab.*
 " *vittata*, *Fab.*
Phyllobrotica decorata, *Say.*
Cerotoma 3-furcata, *Forst.*
Dysonychia pennsylvanica, *Illig.*
Haltica ignita, *Illig.*
Crepidodera helxines, *Linn.*
Epitrix cucumeris, *Harris.*
Systema hudsonias, *Forst.*
 marginalis, *Illig.*
Nyctobates pennsylvanica, *De G.*
Xylopinus saperdioides, *Oliv.*

Monohammus confusor, *Kirby.*
Urographis fasciatus, *De G.*
Saperda vestita, *Say.*
 3-dentata, *Oliv.*
Amphionycha flammata, *Newm.*
Donacia palmata, *Oliv.*
 piscatrix, *Lac.*
 proxima, *Kirby.*
 2 sp. not determined.
** Tenebrio molitor*, *Linn.*
Blapstinus interruptus, *Say.*
Uloma impressa, *Mels.*
Diaperis hydni, *Fab.*
Boletotherus bifurcus, *Fab.*
Cistela sericea, *Say.*
Penthe pimelia, *Fab.*
Eustrophus confinis, *Lec.*
Canifa pallipes, *Mels.*
Stenotrachelus arctatus, *Say.*
Anaspis rufa, *Say.*
Mordella melæna, *Germ.*
 marginata, *Mels.*
Xylophilus tuberculifer, (*infra.*)
Epicauta pennsylvanica, *De G.*
Attelabus bipustulatus, *Fab.*
Ithycerus noveboracensis, *Forst.*
Lissorhoptrus simplex, *Say.*
Magdalis armicollis, *Say.*
Orchestes niger, *Horn.*
Gymnetron tetrum, *Fab.*
Balaninus uniformis, *Lec.*
Eupsalis minuta, *Drury.*
Dryocetes, n. sp.

Loricera cærulescens, *Linn. (pilicornis, Fab.)*. A few examples of this interesting beetle were taken on the margin of the lake under pieces of drift partly immersed in the water. It seemingly avoids muddy places.

Chlænus pennsylvanicus, *Say.* A variety, or rather individuals of this species, occurred with the margins of the elytra bordered with rufous like

in *circumcinctus*, but which lack the smooth facets of the thorax of that species. This is the *circumcinctus* seen in some Canadian lists, but the true *circumcinctus* does not inhabit Canada.

Aleochara graciliformis, *Fauv.* This species, though named many years ago by Mr. A. Fauvel (as I am informed), has never found a place in our catalogue. It has been in my collection from various places in Ontario for several years. It is a very pretty species, black, thorax without impression, legs and elytra bright rufous; an occasional individual has the sides of the elytra narrowly black, and while such are more finely punctate and have darker legs they are not considered distinct.

Philonthus politus, *Linn.* (*aeneus* Rossi). This species was correctly determined by both Kirby and Macklin. It is nearly cosmopolite. The *politus* of our catalogue must be changed to *fuscipennis*, Mann. These are the latest decrees of synonymists.

Creophilus maxillosus, *Linn.* Systematists now recognize but one species of *creophilus* as inhabiting North and South America, Asia, Northern Africa and Europe. It exists in about ten named varieties or variations, *villosus*, Grav., and *bicinctus*, Mann., being the American forms.

Bolitochara picta, *Fauv.* This species was as abundant as in Pennsylvania, being gregarious on mushrooms. My types of this species are from Mr. F. Blanchard, for whom it was determined by Mr. A. Fauvel. It has the habit of a *Gyrophæna*. The antennæ, head, thorax, and last segments of the abdomen are dark; the legs, 3 to 4 segments of the abdomen, and pro and mesothorax are pale; the elytra are pale, with an ill-defined triangular space posteriorly and sometimes a spot around the scutellum dusky. There is at the middle of the base of the thorax a circular depression marked anteriorly with two comma-like impressions. Length, .10 inch.

Baptolinus? longiceps, *Fauv.* As Mr. A. Fauvel has stated that he had seen examples of *longiceps* from Canada, special search was made for that species, resulting in the taking of four examples, which, while not agreeing with Mr. Fauvel's characters of *longiceps* in every respect as given in his synopsis ("Tête alongée, non transverse, un peu plus étroite que le corselet; corps brun; élytres ponctuées"), probably do not vary beyond specific limits; the elytra are rather alutaceous than punctured; the form of the head—"long or transverse"—is opinionative; the colour of the elytra, thorax and head, piceous. One example taken here and two others at Ligonier, in the Alleghanies, are in every way identical

Mr. A. D. Hopkins, Entomologist of the West Virginia Agricultural Experiment Station, to whom one of the Canadian examples was submitted for comparison, kindly states that there is "little perceptible difference" between it and that named *longiceps* for him by Dr. Riley through the National Museum. In the seven examples seen no sexual differences are observable in the head or abdomen. I have examples of a species occurring in the White Mountains of New Hampshire, which is quite different, having a very large head, especially the ♂. It has received the name *macrocephalus*, Nord, but from which it differs by not having the 6th ventral segment of the ♂ emarginate and the thorax tripunctate (Mannerheim's description). I have two female examples from Alaska—one from Wrangel with the thorax tripunctate (*macrocephalus*) agreeing in every other essential point with the New Hampshire females; and one from Prince of Wales Island, with the thorax bipunctate, entirely pallid, and .15 inch long, but otherwise agreeing with the Wrangel example; more material, however, must be seen before their identity can be assured. Thus it appears there are at least three distinct species of *Baptolinus* inhabiting North America, whatever may be said of names. This is the species mentioned as *pilicornis* in CAN. ENT., XXIV., 293, but more material shows that the head is smaller than in that species, the description of which otherwise is fairly applicable; and it is in many ways different from the New Hampshire species. In the article referred to, read (Rev. Entomol., VIII, 117.), *B. longiceps*, Fauv., instead of as in lines 28-29. Mr. F. Blanchard mentions (*in litt*) an example with the head scarcely punctured, taken by him in North Carolina, which probably belongs here.

Dicerca, sp. Two examples, ♂ and ♀, were taken in the lake, which seem to be nondescript; in size and sculpture they resemble *Chrysea*, *Mels.*, to which they were about to be referred till the terminal ventral segment of the ♀ was observed to be rounded; the same segment of the ♂ is truncate and rectangularly emarginate, and the middle tibia toothed. Other examples were subsequently seen in another collection, and it is possibly confused in northern cabinets with *chrysea*, from which it seems best separated by the sexual characters of the female.

Aphodius leopardus, *Horn.* This species occurred in some abundance, as it likewise did at Parry Sound on the Georgian Bay, and at intermediate points. It was not taken with the other species about cow-yards, but on paths through the forest. Before the introduction of domestic

cattle it probably lived in the ejectamenta of deer, moose and other wild animals ; only one example of *lentus* was taken, and that in the forest ; *fossor* was common, and whether it was originally introduced into America from Europe is not free from doubt—it seems to inhabit the colder and mountainous regions, and in Pennsylvania is not uncommon in the Alleghanies. *Ruricola* and *finetarius* were excessively abundant everywhere, and seem to follow cultivation. *Inquinatus* has not as yet appeared in this district.

Dialytes Ulkei, *Horn*. Two examples were taken at Sparrow Lake and another at Rosseau, about 50 miles northward. The type of the species was taken at Deer Park, Maryland, and it is not known to me whether it has ever been duplicated.

Leptura Canadensis, *Oliv*. Occurred in some abundance ; it breeds in the bark of dead pine trees like *Urographus fasciatus* does in that of oak, without entering the wood. All the females seen had the base of the elytra red ; there is no uniformity in the coloration of the outer joints of the antennæ of the ♀ ; the 3rd joint is usually black, with sometimes a pale spot at base ; the 4th is commonly pale at base for half its length, sometimes the lower side is pale for its whole length and the upper black, or again there is merely a pale spot at base ; the 5th is mostly half black, but sometimes with only a pale basal spot ; the 6th may be altogether pale, or with the apex black, or with it spotted on one side or on both ; the 7th is altogether black, but exceptionally with a pale basal spot ; the 8th is altogether pale, with the apex sometimes black ; the 9th is as the 7th ; the 10th is usually pale at base, but sometimes altogether black. The antennæ of the ♂ are black, but in some examples there is a pale spot at the base of joints 6 and 8. These particulars have been entered into to show that antennal colour variation cannot be used to separate into species the variable forms now included in *Canadensis*.

Leptura vagans, *Oliv*. (var. *brevis*, Kirby). This variety should be placed in our catalogue, inasmuch as it exists locally of a fairly constant type ; that is, with dark elytra with a sulphur-yellow discal vitta on each ; this was absent in one example, which was entirely black. The *vagans* form has usually yellow elytra, some examples being marked with brown indefinitely. Without notice it requires some research to discover that *brevis* is *vagans*.

Adoxus obscurus, *Linn*. (var. *vitis*, Fab). This was beaten in great abundance mostly from willow, though that this is its only food-plant is

not affirmed. The variety *vitis* is light brown, very constant in colour, and so far the only form occurring in Canada. The variety *obscurus* is taken abundantly in places throughout the Rocky Mountains to Arizona and New Mexico; typically it is black, but many of the examples are rufous, and in some of these the rows of punctures on the elytra are black, causing a vittate appearance. This rufous form is readily distinguished from *vitis* by the greater intensity of the colour and the much coarser punctostriation of the elytra. These two forms likewise occur in Northern Asia and Europe, as well as three other named varieties.

Dysonycha pennsylvanica, Illig. (var. *limbicollis*, Lec.) was taken in great numbers from *Polygonum hydropiper*, which it had nearly defoliated.

Systema marginalis, Illig., was beaten in great abundance from the dwarf oaks growing among the highest elevated rocks.

Xilophilus, n. s. About a dozen examples of this were taken at one time by bush-beating, but owing to their minuteness only two were found in the bottle, which contained many other insects. It is about half the size of *piceus*, which it resembles in colour, and in having a transverse basal impression on the thorax, though deeper; the elytra are deeply circularly impressed at base, giving rise to two tubercles well separated by the suture; the punctuation of the head and thorax is fine and dense, that of the elytra coarser; between each facet of the eye may be seen a clavate bristle, not extending beyond the facet. The first three joints of the antennæ and the tarsi are pale. The insect is piceous-black, finely cinereo-pubescent, .045 to .05 inch long, and may be called *tuberculifer*, to preserve it from the oblivion often incidental to such small things.

? *Dryocætes*, Sp. This is probably the species cited in Packard's Forest Insects, p. 810, (5th Rep. U. S. Commission), as *Dryocætes*, ? *affaber*, found by Mr. W. Hague Harrington in the cones of *Pinus resinosa*. This insect by difference of antennal club and tibial form does not appear to be a true *Dryocætes*; neither by colour nor elytral striation and punctuation does it conform to Mannerheim's description of *affaber*. Examples were sent to Prof. A. D. Hopkins, of the West Virginia Experiment Station, for comparison with *affaber* as determined by Mr. Eichoff, who writes, "I have compared it with my examples of *Dryocætes*, and find it quite a different thing from any of them; in fact, it differs so widely that I would pronounce it a new species. * * In the club of the antenna and tibia it differs from the other species so much that we might say it belonged to another genus." This species breeds in the cones of *Pinus strobus*, which grow to the length of 6 or 7 inches; the eggs are probably deposited in the young cones early in the season, the vitality of which becomes so much impaired by the larvæ that they drop to the ground when 3 or 4 inches long. Several of these collected the last week in July contained larvæ apparently full grown. Cones opened Sept. 10th contained the perfectly chitinized and maturely coloured beetles—20 or more in each. Therefore the pupa state must have been brief.

NEW NORTH AMERICAN HOMOPTERA.—NO. VI.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

1. *AMALOPOTA FITCHI*, *n. sp.*

Closely allied to *A. Uhleri*. Smaller; elytra smoky, about twice banded with white; nervures carmine, ocelli apparently wanting. Length, 6 mm.

Male: Vertex shorter and broader posteriorly than in *Uhleri*, hind margin very feebly emarginate, apex of the pronotum not advanced beyond the base of the lateral keels; frontal keel, viewed from the side, broader and more strongly rounded, with a more conspicuous notch at the base of the clypeus than in *Uhleri*. Antennæ ligulate, slightly narrowed at base, the sides thickened and parallel beyond, setigerous notch deeper than in *Uhleri*. Eyes very feebly emarginate below. Pronotum, viewed from above, less acutely angled before and exhibiting a slightly thicker edge than in *Uhleri*, the expanded sides subquadrate with rounded angles. Rostrum only attaining the apex of the hind coxæ. Elytra similar in form to those of *Uhleri*, the neuration nearly the same but with fewer apical areoles, these being ten in number from the tip of the clavus to the apex of the subcostal nervure; subapical areoles six, of which the first (outer) is large and oblong, the second small and triangular, and the third the longest; basal nervures four, long.

Colour pale yellowish-white, more obscure on the mesonotum and abdomen; sides of the face with a transverse carmine band between the base of the antennæ and the eye which is extended along the sides of the thorax where it becomes darker; abdomen sanguineous above, the genital segments brown. Eyes and tip of the rostrum black; antennæ reddish-brown, the thickened edges darker. Elytra blackish-fuscos; a basal elongated yellowish spot on the costa including the rounded elytral appendage; beyond this are two rounded dots, a broad transverse median band not touching the costa, and a large angular spot on the third and fourth subapical areoles sending a branch to the apex of the costa and another to the middle of the apical margin, whitish-hyaline; narrow costal area white with four brown spots, the stigmatal deeper and crossed at apex by a heavy carmine veinlet; nervures carmine-red, heavier about the stigmatal region, around the apex alternated with white; costa and a line on the commissure near the apex of the clavus, yellowish. Wings whitish-hyaline, with slender sanguineous nervures.

New York. Described from a single example beaten by me from a tree of the wild black cherry among the hills about twenty miles south of this city, on July 28th, 1892. This delicate little creature is a very interesting addition to our list of North American Derbidae. Though quite distinct it is closely allied to the *A. Uhleri*, described in 1889, from Western New York specimens. (See CAN. ENT., Sept., 1889). The characters of genus *Amalopota*, founded by me for the latter species, must be somewhat modified for the reception of *Fitchi*, as in this species the ocelli seem to be wanting, while in the *Uhleri* they are quite distinct, though small and but poorly defined. This genus, though certainly valid, is very near *Anotia*, and forms a connecting link between it and *Otiocerus*.

✓2. *CICADULA SLOSSONI*, n. sp.

Form and ornamentation of *C. variata* nearly, but much smaller, with the vertex shorter and the black markings more elaborate. Length, $2\frac{1}{2}$ to 3 mm.

Vertex $\frac{1}{4}$ longer on the middle than next the eye, blunter before and more rounded in both directions than in *variata*. Whole head much more deeply and coarsely punctured, the clypeus a little more narrowed apically, and the outer margins of the cheeks under the eyes shorter and more deeply excavated, with the outer angles more prominent than in *variata*. Pronotum distinctly transversely wrinkled, omitting the broad posterior margin which is closely punctured; in *variata* the pronotum is nearly smooth and more convex. Sides of the pronotum shorter, with the lateral angles more rounded and the latero-posterior edges more oblique than in *variata*. Last ventral segment of the female long, closely appressed over the base of the pygofer, the hind margin slightly waved, not distinctly notched on the middle as in *variata*. Valve* of the male shorter than in *variata*, with the apical margin but feebly arquated; the plates longer and with their attenuated points longer and less recurved than in the larger species.

Colour: Head yellow; vertex with a large oval black spot on each side including a yellow dot and sending a branch anteriorly to the eye, apex with two large transverse black spots; about four broken arcs on the base of the front, a cloud beneath the eye, all the sutures of the face and the median line black, the latter expanded on the apex of the clypeus and the disc of the front. Antennæ dusky. Pronotum tinged with yellow anteriorly and marked with black along the fore border, and a double brown longitudinal median band widening on the hind margin.

Scutellum black, with the tip, the lateral margins anteriorly, and a median line reaching only to the transverse impressed line, yellow. Elytra white, dusky toward the apex, marked as in *variata*, with oblique brown bands forming a lozenge anteriorly, including a pale commissural spot, and an x posteriorly with the tip of the clavus as its centre, the median bands being common to both marks. These brown bands do not attain the costal margin, and are more strongly distinguished than in *variata*. Abdomen and pleural pieces deep black, the margin of the tergal pieces slenderly yellow, venter sometimes yellow with the segments and connexivum bordered within their margins with blackish. Legs brown, the joints and tibial spines pale.

New York ; New Hampshire. Described from three examples ; one male taken by me at Lancaster, N. Y., July 12th, 1889, a female taken at "High Bridge," New York City, in June, by Mr. E. B. Southwick, and a second female taken on the summit of Mt. Washington by Mrs. Annie Trumbull Slosson, to whom I take pleasure in dedicating this pretty little species as a slight tribute to her persevering devotion to the study of entomology.

✓ 3. *CHLOROTETTIX NECOPINA*, n. sp.

Form and size of *tergatus* nearly. Vertex with a black transverse band between the eyes. Colour above greenish-testaceous, marked and clouded with brown ; elytra fuscous, with strong white nervures. Length, 7 mm.

Vertex a little more produced than in *tergatus*, and the front proportionately longer and narrower ; ocelli contiguous to the eyes. Last ventral segment of the female thin, broadly and deeply cleft nearly to its base ; this incisure at its apex armed with a small blunt tooth, the lateral lobes ovate, in one example feebly angled at apex. Pygofer stout, very slightly exceeded by the oviduct, and armed with a few stout brown bristles. Other characters about as in *tergatus*.

Colour : Beneath pale greenish tinged with testaceous, especially on the front, which is marked on the sides by about ten nearly obsolete brown arcs, and two brown dots are at the base of the clypeus ; eyes dark brown edged with pale. Vertex with a broad transverse blackish band just behind the ocelli. Pronotum testaceous, pale before and on the median line, either side of which is a brown cloud, and a smaller one occupies the latero-posterior angle, transverse wrinkles less distinct than in *tergatus*. Scutellum marked with a piceous triangular spot within the

basal angles, the median line, a dot on either side, and the impressed line brown. Tergum fuscous, testaceous on the sides, the segment, edged with pale. Elytra fuscous-brown, nervures conspicuous, white, brown at apex. Wings smoky, iridescent, nervures brown. Legs pale testaceous, claws and tip of the rostrum piceous.

Mississippi. Described from two female examples kindly sent me by Mr. Howard Evarts Weed.

This very distinct species is quite anomalous in the genus in which I have placed it by its dark colouring and conspicuous markings, thus allying it with *Limotettix parallelus*. In most of its characters, however, it is closely related to *Chlorotettix tergatus*, near which it must be placed.

✓ 4. *ATHYSANUS EXTRUSUS*, n. sp.

Form of *A. variegatus*, Kirschb., broad and short; pale greyish-yellow, vertex with a transverse blackish band, elytral nervures pale. Length, $4\frac{1}{2}$ mm.

Vertex longer and more pointed than in *obsoletus*, nearly $\frac{1}{3}$ longer on the middle than next the eye; a broad transverse band on the disc and an angular spot at apex blackish, each bisected by the longitudinal median pale line. Face pale, front black with about eight pale arcs or pale with as many blackish arcs, sutures of the face and a double longitudinal line on the middle of the clypeus black; antennæ pale, set on a black cloud. Clypeus slightly narrowed to the truncated apex, its base arquated. Cheeks feebly angled without, exterior to the outer line of the loræ longitudinally wrinkled; tip of the rostrum black. Pronotum hardly longer than the vertex, mottled with dusky and showing four or five pale longitudinal lines, more or less obsolete; hind edge strongly concave, surface transversely wrinkled, broad anterior margin smooth and calloused; sides longer than in *obsoletus*, carinated; latero-posterior margins very oblique, almost continuous with the posterior margin. Scutellum with four or five brown spots, the posterior sometimes obsolete. Elytra short and broad, hardly exceeding the tip of the abdomen, pale, the areoles more or less heavily edged with fuscous. Abdomen brown or almost black, edge fulvous, with a few fulvous clouds beneath; pleural pieces brown, pale margined; legs pale, the femora banded with brown and the tibiæ dotted at the base of the spines. Valve of the male broad, triangular, apex obtuse; plates irregularly quadrangular, widely spreading, touching only at base; outer angles produced, subacute, armed with a few long bristles; inner angles rounded; styles very long, extending for

half their length beyond the apex of the plates, ligulate in form and curved downward and outward at apex; pygofer rounded at apex, almost equalling the plates, the small anal aperture placed superiorly.

New York; Connecticut. Described from three males. One taken at Portage Falls, N. Y., May 30th, 1888. The other two specimens were taken by me in Connecticut in the spring of 1883. One of these was swept from weeds and bushes on the hills about Northford, June 26th; the other, a very deeply coloured example, I found in a grove on Prospect St. in New Haven, June 4th. The long extruded styles of the males will at once distinguish this from any other of our described species of *Athysanus*.

5. *ATHYSANUS INSTABILIS*, *n. sp.*

More elongated than most of our species of this genus. Black, irrorated and finely marked with pale yellow. Elytra pale, the areoles edged with fuscous. Length, 4-4½ mm.

Head obtusely pointed before; vertex about ⅓ longer on the middle than next the eye, passage to the front well rounded, base with a few impunctured areas. Ocelli large, fulvous, distant from the eyes; temples broad; front convex, the sutures arquated at the antennæ and incurved at apex; clypeus feebly narrowed towards its slightly rounded apex; cheeks rather narrow, but feebly angled, not exceeding the clypeus. Pronotum rather long, with the sides long and carinated, latero-posterior edges straight, angles prominent, obtuse, surface strongly punctured or shagreened. Elytra long, with the appendix well developed. Valve of the male short, obtuse at apex; plates forming an equilateral triangle, fulvous clouded with dusky, their edges nearly straight, fringed with pale bristles. Last ventral segment of the female slightly produced and rounded on the middle, feebly arquated either side within the short subacute lateral angles; pygofer rather small, slightly exceeded by the oviduct.

Colour black. Base of the vertex, outer edge of the cheeks, and margins of the eyes slenderly yellow. Two transverse spots on the disc of the vertex near its base, two lines anterior to these, one or two dots near each eye, an angled slender line on the apex including a dot behind, a dot on the temples, about six arcs, a basal spot and a longitudinal line on the front, the latter expanded against the base of the clypeus, and

a spot on each lora, fulvous-yellow; disc of the cheeks with a pale cloud which sends a branch along the upper edge of the lora to the front. Antennæ black, base of the seta pale. Pronotum irrorate and narrowly edged with pale, with a few irregular yellowish marks along the anterior border. Middle line of the scutellum, a curved mark either side of this on the basal field and the margins yellow, the latter interrupted at their middle. Narrow edges of the abdominal segments and the spines of the pygofers pale. Femora with a fulvous band; hind tibiæ yellow, dotted with piceous, the spines and claws whitish. Elytra soiled white, smoky at tip, nervures concolorous broadly bordered with fuscous, the costal and commissural pale.

Michigan; Colorado. Described from one male and three female examples taken at Agricultural College, Michigan, by my friend Mr. G. C. Davis, and another female received from Prof. C. P. Gillette, taken in Colorado.

This insect is nearly allied to the species described by me as *Athysanus striatulus*, Fall. (?), in Ent. Am., vi., p. 134, like which it has a well-developed elytral appendix. Two of the specimens before me have a second transverse nervure between the first and second sectors of the elytra, thus allying them to *Deltocephalus*, but for the present it seems better to place them in genus *Athysanus*.

Our described North American species of *Athysanus* may be arranged as follows:—

- A. Stout species with a short vertex and abbreviated elytra, without an appendix:—
 - 1. *A. obsoletus*, Kirch. 2. *A. extrusus*, Van D. 3. *A. comma*, Van D. 4. *A. plutonius*, Uhler.
- B. Smaller, more elongated species, with more produced subconical heads and longer elytra without an appendix:—
 - 5. *A. Curtisii*, Fitch. 6. *A. bicolor*, Van D. 7. *A. obtutus*, Van D.
- C. Species similar in form to those of the last section, but with a shorter head, flatter vertex, and longer elytra with a well-developed appendix:—
 - 8. *A. instabilis*, Van D. 9. *A. striatulus*, Fall. (?).

NOTES ON A POLYMORPHIC BUTTERFLY, SYNCHLOE
LACINIA, GEYER (IN HUB. ZUTR.), WITH DES-
CRPTION OF ITS PREPARATORY STAGES.

BY W. H. EDWARDS, COALBURGH, WEST VA.

"Godman and Salvin, Rhopal. I., p. 177, 1882, under the specific name *Lacinia*, place *Saundersii* and *Tellias*, Bates; *Quehtela* and *Artema*, Reakirt; *Paupera*, Felder; *Mediatrice* and *Misera*, R. Felder; *Pretoria*, Boisduval; *Crocale*, Edwards; *Adjutrix*, Scudder, and *Adelina*, Staudinger; all of which they consider but inconstant forms of one species. From their works we quote: 'Between these extremes, *Adelina* and *Saundersii*, every gradation of colour can be traced, and all the rufous markings, as well as the yellow ones of the under side, can be exhibited in different individuals from their maximum development till they vanish altogether. . . . In the Southern States of North America, a form occurs which is very like *Saundersii*, and is prevalent in Texas. This is *Adjutrix*, Scudder, but we doubt the possibility of maintaining its distinction. In Arizona another form occurs, *Crocale*, Edw., which we take to be undistinguishable from *Adelina*, and therefore connected with the whole series.'" Quoted from E. M. Aaron, in *Papilio* IV., p. 177, in his paper entitled List of a Collection of Diurn. Lepid. from Southern Texas. Mr. Aaron adds: "Among these Texas captures were *Saundersii*, *Adjutrix* and *Mediatrice*; the latter two were taken in copulation."

I have not access to the works of Godman and Salvin, but Dr. Skinner informs me that they figure eleven forms of this species, and its localities extend even to Peru and Bolivia. These authors based their opinion as expressed not at all, so far as appears, from rearing the larvæ. Indeed, until recently, no one seems to have been acquainted with any of the preparatory stages, not only of *Lacinia*, but of any species of the genus *Synchloe*. In 1892, Prof. Packard sent me in a tube with alcohol an adult larva and pupa, received by him from Prof. Tyler Townsend, of Las Cruces, N. M. In 1893, by the aid of Mr. T. D. A. Cockerell, also of Las Cruces, I have been able to study all the stages from egg to pupa. He wrote 7th July: "I saw a black and white butterfly, rather like a small *Limenitis* (was it not *Synchloe Crocale*?) settle on two or three leaves of a sunflower." On 26th July: "Yesterday, Prof. Owen took me to his ranch, a short distance from Las Cruces, and I got there some *Crocale* larvæ, which I send herewith. I find that the young are gregarious, feeding as closely as they can stand on the upper side of a leaf of

Helianthus, which they skeletonize, instead of devouring the whole thickness, as older ones do. They remind me of the young larvæ of *Vanessa Urticae*. The older larvæ I send are of a red variety. The larvæ are trimorphic, with forms as follows:

1. *nigra*, a black form.
2. *bicolor*, black with broad red dorsal stripe.
3. *rufa*, red form."

Again: "The *Helianthus* appears to be the common *H. annuus*. One finds several larvæ (adult) on one plant. Each has a leaf to itself, and they select the large leaves, not the young tops. They rest on the middle of the leaf, feeding by day, exposed to the sun. They must be inedible to birds, as they are very conspicuous. They gnaw holes out of the middle of the leaf. I could not see that they make any sort of web, and when alarmed they drop to the ground. At one place I found three or four, all black. One larva found on a narrow-leaved composite (not in flower) was about to pupate. It may have wandered from a sunflower, though there was none nearer than several yards. It was pupating quite exposed on the leaf."

On July 29th: "Yesterday, I found some batches of larvæ about one-half grown, still gregarious, and for the most part on the under side of the leaves. One batch was entirely of black larvæ, but another, to my surprise, contained all the variations mentioned in former letter. In the majority of cases a brood is all of one colour, but at least sometimes the three colours may all appear in one brood. I also enclose a *Crocale* butterfly which was caught and killed by a large Asilid fly (*Proctacanthus Philadelphicus*, Mocq.)"

Aug. 27th: "Yesterday I was in Juarey, Mexico (across the river opposite El Paso), and got a lot of insects. Among them both typical *Crocale* and the orange-shaped *Adjutrix*, as also a very pretty aberration, *rufescens*. I send all these herewith, as also what I call ab. *nigrescens*, an unusually black form of *Crocale* proper, which I bred here in Las Cruces."

There came two labelled *rufescens* and considerably unlike. One has a broad red band across both wings reaching nearly to costa of primaries, with marginal red spots on both wings; the other has the red band on hindwings one-half wider than usual and of deep colour, but there is nothing of it on forewing, nor are there marginal red spots. Both these varieties, I doubt not, have received species names. The bred *nigrescens*

has the spots that compose the white mesial band on hindwings reduced to mere streaks of white on the nervules. No doubt this has received a species name. But one of the Juarey examples is plainly *Ardema*, of Reakert: "hindwings black, with an indistinct orange-brown shade across the disk."

Mr. Cockerell wrote 9th Sept.: "On the college farm, yesterday, I found a batch of *Synchloe* eggs on the under side of a sunflower leaf. They are like the eggs I sent before. They are like the eggs of *Melitæa*, as figured by you in Butt. N. A. *Synchloe* seems to be practically a *Melitæa* in its earlier stages. I send one example of larva, black with numerous yellow-white dots, a sub-variety of the black type. I found several such."

During the season I had also received several batches of larvæ of *Phyciodes Carlota*, from Montana, and eggs of same from Colorado, and the larvæ from the *Crocæle* eggs were reared at same time with the others, so that I was able to compare the two species step by step. The eggs of the two are in no way distinguishable, nor are the larvæ in the first two stages; as regards shape and armature they are alike in the succeeding stages, but differ in coloration. But the pupa of the *Synchloe* is not like that of *Carlota*, which is of the typical *Phyciodes* shape and appearance, and like *Tharos*, but is closely like the pupa of *Melitæa Baroni*, as given in Butt. N. A., Vol. III, pt. 3. The stages are described as follows:—

EGG.—Similar to *Phyciodes Tharos*: obovoid, truncated at top, rounded at bottom, the lower three-fifths, or about that, examples varying, covered with irregular shallow indentations; the upper part ribbed, about twenty-four ribs, not much elevated, not sharp, the interspaces roundly and shallowly excavated; top slightly depressed; colour when first laid pale green, later changing to green-yellow. Laid in close clusters side by side in several rows. In the cluster under view each complete row (4) contained just nine eggs, and there were shorter rows on either side of these; on the top was part of another layer, placed irregularly and more or less on their sides. These eggs were believed to have been laid 8th Sept., or on the day when found, and hatched on 15th, or after six days.

YOUNG LARVA.—Length at one day from egg, .06 inch; cylindrical, even, each segment well rounded; furnished with many tapering black hairs, or processes, of which those on segments 3 and 4 are in cross line on the middle, four on either side above the spiracular line; on 2 is a black oval chitinous patch on top of dorsum, on which are six shorter

processes in line, and another on each side just below the patch; also two others in vertical row to the front and opposite the spiracle, on segments 5 to 12 inclusive six processes, three on either side, arranged in triangle as usual in the family; on the front of 13 are six in cross line, and the triangle on either side to the rear; along base of body one similar short process over each foot, two on 5 and 6 each, and one each to the remaining segments up to 12, in addition to which is a still shorter process over base of each proleg, and on 5, 6, 11 and 12 below the other; colour green, with a brown tint; head scarcely broader than 2, obovoid, slightly bilobed, shining black-brown, with scattered short processes over the face like those of body. Duration of this stage three days.

After first moult: Length at one day, .1 inch; colour variable, some examples being light brown with a green tint, some of brown of darker shades; the spines as in *Phyciodes*, rather short, slender and tapering, glossy black, with short bristles about them at a small angle, and rising from shining black tubercles; head cordate, glossy black, with many curved processes on the front. Duration of this stage, three days.

After second moult: Length at one day, .14 inch; colour variable, some larvæ being wholly black, some rust yellow, some of this last have on dorsum and lower half of side, a dark brown sub-dorsal band intervening; the spines rather longer in proportion than before, otherwise similar; head as before. Duration of this stage, three to four days.

After third moult: Length at one day, .3 inch; shape and spines as before; the colour as before, but the russet more red, and on those which are wholly russet are two black cross lines to each segment, one on the rear, the other at the junctions; head as before. To next moult, about four days.

After fourth moult: Length at one day, .52 inch; variable as before, the rust colour deepened into red-fulvous. At about six days was full-grown.

MATURE LARVA.—Length, .1 to 1.2 inch. Cylindrical, even; colour very variable, some being bright red-fulvous; at the junction of the segments a stripe of glossy black, and on 4 to 10 inclusive a narrow, dull black stripe near the rear of each; under side greenish-brown, as is also the front of 2; on the middle of 2 a dorsal chitinous collar, on which are six small spines, three on either side the mid-dorsal line; a little below these another; a long spine below the spiracle; the spines on the succeeding segments arranged as in *Melitea*, black, shining, not long in pro

portion to the size of the body, rising from shining black tubercles, tapering to an irregular top, and surrounded by many short black bristles set at a small angle; head cordate, black, glossy, with many tapering hairs or processes on the face. Other examples are yellow-fulvous; others have a continuous red-fulvous band on dorsum, rather wider than the tubercles of the dorsal row of spines; or this band is macular, a rectangular spot being on each segment, bearing the spine; the lower part of side is also red-fulvous, and the intervening space is dark-brown, forming a sub-dorsal band the length of the body. The red on dorsum is sometimes reduced to a small patch on each segment, on rear. Others are black throughout, except that over the upper part are specks and minute spots of white or yellowish; others are black, but from the second lateral row of spines to basal ridge is a band of greenish-white and black, mottled, and sometimes the upper edge of this band shows a macular fulvous line. In all, the spines are black. There are at least three distinct types of larva:

1st.—All red- or yellow-fulvous.

2nd.—The dorsum and lower part of side fulvous; the subdorsal area dark-brown.

3rd.—All black, or black with a greenish band on side.

From fourth moult to pupation, about seven days.

CHRYSLIS —Length, .45 to .52 inch ♂; .55 to .64 inch ♀. In an example of which the length was .52, the breadth both at mesonotum and abdomen was .2 inch; cylindrical, shape of *Melitæa*; head case short, narrow at top, and a very little incurved, the sides excavated; mesonotum rounded both ways and rising to a slight prominence on the rear, but not carinated, followed by a slight depression; abdomen conical; the wing cases somewhat elevated, bevelled down to the abdomen on the margin; colour the first day white, pink-tinted, then becoming ivory-white, specked and spotted with black, with some black bands or stripes; a stripe across the top of head case, a band from end to end on the ventral side; some spots on the head case; on mesonotum two spots in front, two on rear, one on either side (at the tubercle); in some examples these are mere points, but in others large, and form a ring around the middle of the mesonotum; on the abdomen a black crescent on the anterior side of each tubercle; on middle of wing case a bent bar, two patches at hind margin, and several dots; the tubercles correspond to the spines of the larva, and are low, conical, orange. But there is great

variation in the size of the black marks, and there is every grade to a nearly black pupa, black marked with white. No two of the melanic examples were alike. Duration of this stage, five to seven days. By the above, it will appear that the pupæ also are polymorphic, some being almost wholly white, some almost wholly black, with all sorts of intergrades.

These resulted from the pupæ reared in July and August imagos which came out between 2nd August and 19th :—

1st.—From all red larvæ.....	3	orange banded, or <i>Adjutrix</i>
	8	white banded, or <i>Crocale</i>
2nd.—From all black larvæ.....	15	<i>Adjutrix</i>
	3	<i>Crocale</i>

From pupæ of the succeeding brood of larvæ, the imagos out between 29th August and 8th September :—

1st.—All red larvæ.....	4	<i>Crocale</i>
2nd.—All black larvæ.....	2	<i>Crocale</i>
	4	<i>Adjutrix</i>
3rd.—Red backed larvæ.....	13	<i>Crocale</i>
	3	<i>Adjutrix</i>
	1	with a very slight orange tint.
	1	very red and broad band.

The last brood of larvæ of the year, out of eggs hatched Sept. 15th, hibernated after third moult early in October. As this is exactly the habit of the *Phyciodes* (as *Nycteis* and *Carlota*), we may assume that the larvæ on their waking up early in spring, (Feb. or March, no doubt, at Las Cruces), would be in pupæ within two weeks thereafter, to give imagos a few days later. Probably, therefore, the butterflies are on the wing by April, and thereafter a brood will appear at least monthly. If this is so, the first larvæ received by me, in July, would have come from the third generation of butterflies of the year. This generation, from 29 pupæ, gave 18 *Adjutrix* imagos to 11 *Crocale*, or 62 per cent. *Adjutrix*, and 38 per cent. of *Crocale*. The following generation, from August larvæ, out of 28 pupæ gave 19 *Crocale* to 9 *Adjutrix* (including all red-banded), or 68 per cent. *Crocale* and 32 *Adjutrix*. The proportions in the two generations were nearly reversed, and as the season goes on there would seem to be a tendency to produce the white banded form. It will be of interest to watch the outcome of the hibernating larvæ, and I hope by Mr. Cockerell's aid next season to learn which form prevails in the two or three earliest generations.

As I am correcting the proof of this paper, I can add from a letter of Oct. 21st, from Mr. Cockerell :—"The *Synchlœ* is still flying here in fair numbers. I find that in a state of nature the larvæ hibernate gregariously in the dead, curled up leaves of the sun-flower.

ON A SEEMINGLY MICROLEPIDOPTEROUS LEAF-MINER OF THE NARROW-LEAFED COTTONWOOD.

BY C. H. TYLER TOWNSEND, KINGSTON, JAMAICA, W. I.

In the same leaves of *Populus angustifolia* in which were found the tenthredinid (lepidopterous?) leaf-miners,* in the Canada Alamosa, northern Sierra county, N. Mex., in June, 1892, there were also found specimens of a very distinct leaf-miner. It bears a striking resemblance to the leaf-miner of the vine found in the Mesilla valley of the Rio Grande. It possesses the sucker-like mouth of that miner. After being mounted in glycerine on a slide for several days, however, the outer portion of the distended sucker-like organ became transparent, exposing within what appear to be two stout rounded mandibles with teeth on their inner edges.

Since this miner is footless, and yet possesses toothed mandibles, I infer that it is microlepidopterous. It mines on the lower side of the leaf, not being visible from above.

Description of miner.—Length, $3\frac{1}{2}$ mm. Colour entirely white. Whole larva fleshy, consisting of thirteen segments. Widest anteriorly, narrowing posteriorly. Segments laterally rounded, the anterior ones especially projecting on sides, the body being laterally deeply incised at sutures. Head rather triangular in shape, running to a blunt point anteriorly, widest behind—where it is less than $\frac{2}{3}$ the width of prothoracic segment. Anterior end of head terminated with a sucker-like organ distally distended, constricted at base into a neck-like junction with the head, enclosing and concealing a pair of apparently corneous jaws or mandibles. Mandibles are a little longer than wide, rounded-oblong, furnished on inner edge with three recurved or posteriorly directed teeth. Antennæ springing from anterior lateral edge of head just posterior to the neck-like constriction of the sucker-like capsule which encloses the mouth-parts. The antennæ are apparently 4-jointed, but possess some supernumerary bud-like joints. First two joints about same length, the basal one slightly thicker; third joint less than half as thick and shorter than second, accompanied by two slender bud-like or tooth-like joints which spring from the second joint and are shorter and narrower than third joint. Fourth joint a little shorter and smaller than third, about size of the supernumerary joints just described, accompanied by a shorter super-

*See article "Another leaf-miner of *Populus*," in Journ. N. Y. Ent. Soc., Vol. I,

numerary joint which is terminated by a bristle. Eyes situated immediately behind base of antennæ, on outer edge of head, appearing as a black dot with three other dots in a row behind. Prothoracic segment widest; mesothoracic and metathoracic segments about same width, and a little narrower; segments 5 to 7 about equal, and much narrower than thoracic segments; 8 to 11 successively and gradually narrowing, 12 a little longer than 11; 13 widened, especially posteriorly, narrowing anteriorly, incised on lateral edge. All the segments nearly the same length, the posterior ones more elongate for their width, head longer than prothoracic segment. Surface of body very thinly clothed with a few fine moderately long hairs, some on head. Feet and legs entirely absent.

Described from an alcoholic specimen in a glycerine mount. A second specimen, about the same size, has the segments more approximated, body hardly as tapering posteriorly, lateral incisures hardly as deep, and the anal segment not widened. It is, perhaps, the same species. Canada Alamosa, June 17.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The annual meeting of the Society was held in its rooms in Victoria Hall, London, on the 11th and 12th of October, the vice-president, Mr. J. M. Denton, occupying the chair in the absence of Mr. Harrington, the president, who was unfortunately unable to be present. The reports of the treasurer, librarian and curator, the council, the botanical, ornithological, geological and microscopical sections were read and approved. Several interesting papers were read and addresses delivered. A number of rare and remarkable specimens were exhibited. Full reports of the proceedings will be published in the forthcoming annual report to the Legislature of Ontario.

The following gentlemen were elected officers for the ensuing year:—

President—W. Hague Harrington, Ottawa.

Vice-President—J. Dearness, London.

Secretary—W. E. Saunders, London.

Treasurer—J. A. Balkwill, London.

Directors—Division 1—James Fletcher, F. L. S., F. R. S. C., Ottawa.

“ 2—Rev. C. J. S. Bethune, F. R. S. C., Port Hope.

“ 3—Gamble Geddes, Toronto.

“ 4—A. H. Kilman, Ridgeway.

“ 5—R. W. Rennie, London.

Librarian and Curator—J. Alston Moffat, London.

Editor of the CANADIAN ENTOMOLOGIST—Rev. C. J. S. Bethune, M.A., D. C. L., Port Hope.

Editing Committee—J. Fletcher, Ottawa ; H. H. Lyman, Montreal ; Rev. T. W. Fyles, South Quebec ; J. M. Denton and J. H. Bowman, London.

Delegate to the Royal Society—Rev. T. W. Fyles, South Quebec.

Committee on Field Days—Dr. Wolverton, Messrs. Clement, Elliott and Stevenson, London.

Auditors—J. H. Bowman and J. M. Denton, London.

HYBLÆA PUERA, CRAMER.

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEXICO.

Mr. Butler (P. Z. S., 1892, p. 133) remarks concerning the *Hyblæida* (*Hyblæina*, I would rather write) as follows :—

"The position of this family is somewhat doubtful ; the aspect of the species forcibly reminds one of the Tortricæ, but the neuration does not altogether correspond with that of the Tortricidæ ; at the same time the *Hyblæidæ* do not appear to be true Noctuities." How this may be, I cannot venture to judge, but *H. puera* is very common in Kingston, Jamaica, and as I have bred it, a description of the larva may help to decide the question.

Larva : about 19 mm. long, rather reminding one of the *megacephala* group of *Acronycta*. Body cylindrical, with sparse hairs of moderate length. Head shining pitchy-black. Body black above, with a more or less interrupted red dorsal stripe ; and very narrow subdorsal white stripes, much broken into spots. The black continues as far down as the spiracles, but just above the spiracles is another broken white line, like the subdorsal. There is a narrow yellowish-white band along the lower margin of the black, and below this the body is marbled with grey and pale reddish-brown, a small hair-patch below each spiracle being ringed with white. Abdominal legs pale brown. Thoracic legs shining red-brown. The first 3 and the last body-segments are almost entirely black beneath. Lives in curled-up leaves of *Catalpa*, in which it pupates.

Pupa bright red-brown.

Larva and pupa found in Kingston, May 3, 1892. Three moths emerged on May 10.

Mr. J. J. Bowrey has briefly referred to the larva in Handbook of Jamaica, 1881, p. 118. Moeschler, in his Porto Rico work, says the larva is found on *Crescentia* and *Tecoma*. The distribution of the insect is extraordinary—West Indies, Brazil, Java, Ceylon, Nepal, China, S. Africa, Madagascar, Mauritius, etc.

BOOK NOTICES.

EXPERIMENTAL FARMS: REPORTS FOR 1892. Printed by order of Parliament: Ottawa, 1893.

This valuable "Blue-book" has been before us for some time, having been distributed in April last, but various circumstances have prevented us from noticing it and several other publications, for which we are indebted to the courtesy of the authors. Our readers will, of course, be chiefly interested in the report of Mr. James Fletcher, the Entomologist and Botanist of the Central Experimental Farm at Ottawa, which occupies twenty-four pages of the volume. After mentioning the chief insect attacks of the year, Mr. Fletcher gives an interesting and valuable account of the life-histories of the Hop-vine Borer (*Hydracia immanis*, Guén.), the Red Turnip-beetle (*Entomoscelis adonidis*, Fab.), the Western Blister-beetle (*Cantharis Nuttalli*, Say), and the Birch Bucculatrix (*B. Canadensisella*, Chamb.); in these there is much new and original matter, as well as a summary of the previous observations of others. The identification of the hop insect, which is also called, from its mode of attack, the "Collar-worm of the Hop," is particularly interesting. Its injuries have been observed for more than twenty years, but it was a long time before the moth was reared from the destructive larvæ and its identity established. The most effective remedy for this insect appears to be the encouragement of the unsavory skunk in the hop-yards; in the northern part of the State of New York and in Wisconsin, this animal has been found most useful from its habit of digging round the infested plants and devouring the worms. The turnip and blister-beetles referred to have been very destructive in the Northwest Territories, the latter attacking the Windsor Bean, while the Birch Bucculatrix has infested the trees in the neighbourhood of Ottawa. Mr. Fletcher also describes several useful parasites which serve to keep in check the currant and willow saw-flies and other injurious insects. The remainder of his report is devoted to an account of the potato-blight which affects the leaves of the plant, and the potato-rot affecting the tubers, and a chapter on lawn grasses and fodder plants.

CATALOGUE OF THE LEPIDOPTEROUS SUPER-FAMILY NOCTUIDÆ FOUND IN BOREAL AMERICA: By John B. Smith, Sc. D.: (Bulletin No. 44 of the United States National Museum). Smithsonian Institution, Washington, 1893.

This volume of four hundred and twenty-four pages will be heartily welcomed by every student of the Noctuidæ of North America. It is not a mere list of species, but a complete bibliographical and synonymical

catalogue. The authority, date and reference are given for each genus, and under each species are given the date, author and place of publication of the original description, followed by any other published references, the synonymy, habitat, and where the type can be found. Anyone who has attempted to keep a record of the published references to our Lepidoptera—and we have all been compelled to do so in some form or other—will appreciate the immense amount of labour that Prof. Smith has performed in the preparation of this work, and must feel heartily grateful that he has now relieved us of a task that few are competent to accomplish satisfactorily. The saving of time, and the satisfaction of knowing that one is not now likely to overlook anything that has been published regarding a species, are no small boons to the student. For a full explanation of the origin and purpose of the work, we must refer the reader to Prof. Smith's somewhat lengthy preface, which will be found well deserving of careful perusal. The general index at the end of the volume makes the work complete, and we have no hesitation in saying that it is the most useful publication on the North American Noctuidæ that has yet been issued from the press. We trust that the author will before long be able to lay us under still greater obligations to him by the publication of his contemplated monograph of the whole of this family of moths.

CORRESPONDENCE.

CORRECTION.

Sir,—In my last paper, "Washington Tenthredinidæ, etc." I find that I have made the following mistakes:—Page 238, line 13 from top, 23 from top, and page 239, line 6 from bottom, the word *labium* should in each case be *labrum*.

A. D. MACGILLIVRAY.

CALLIDRYAS EUBULE.

Sir,—On the 5th of October last I observed a bright yellow butterfly, much larger than any of our species of *Colias*, flying in the street here, but it soon passed out of sight over some houses. On the 9th inst. I observed some others, and at last succeeded in capturing what proved, to my great delight, to be a specimen of *Callidryas Eubule*, the first taken in the State of Iowa. Hitherto it has not been seen north of Missouri; though I have collected in this State for ten years, I have never met with this butterfly before, but now I have taken no less than four specimens, all females, and so fresh that they look as if they had just emerged from the chrysalis. Keota is built upon "the divide," and is ten miles either north or south from any heavy belt of timber, or any large stream of water. These specimens must therefore be "wind-visitors," as Mr. Grote terms them, and have been wafted here by the air-currents from the south.

A. S. VAN WINKLE, Keota, Iowa.

Mailed November 4th.

